INGEN
Smart Solutions for Secure Tomorrow

WRMS
Farm Smart. Secure Tomorrow.

Automatic Weather Station
— by INGEN Technologies

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About Us

Wholly-owned subsidiary of WRMS

Ingen Technologies Private Limited, founded in the year 2008 as a subsidiary of Weather Risk Management Services Private Limited, is a leading Weather Service provider in India, with a supply of more than 15,000 Automatic Weather Stations (AWSs) & Automatic Rain Gauges (ARGs) across the globe and more than 10,000 installations PAN India.

Ingen leverages indigenously manufactured advanced technology, and its strong in-house team of meteorologists, remote sensing experts, and IoT specialists, to provide weather data & forecasting services to various corporations and government organizations in insurance, energy, and agriculture sectors.

Global Footprint

AWS Network

+10,000 AWS across India

In collaboration with various State Government

IMD Certification

ISO 90012015 INGEN

PRESSURE SENSOR

SILICON PYRANOMETER

TEMPERATURE RELATIVE HUMIDITY SENSOR

TIPPING BUCKET RAIN GAUGE

ULTRASONIC WIND SPEED & DIRECTION SENSOR

Why Us?

1. Indigenous Manufacturer of Automatic Weather Stations

We, at Ingen Technologies, take great pride in offering indigenously-manufactured Automatic Weather Stations customized for your specific requirements.

End-to-end Management of AWS

- Manufacturing | Supply | Installation | Operation
- Capacity of manufacturing 500 AWS per month
- Customized design with state-of-the-art technology
- Continuous hardware updation

2. Global Standard Technology

Our sensors conform to the WMO (World Meteorological Organization) standards and are IMD (India Meteorological Department) certified.

- IMD Certifications: Humidity Sensor, Temperature Sensor, Tipping Bucket Rain Gauge, Silicon Pyranometer and Ultrasonic Wind Sensor

3. Top-notch Team

We leverage our strong in-house team of meteorologists, remote sensing experts, and IoT specialists to provide accurate & real-time weather data & forecast services.

- In-house R&D, Hardware, & Software teams linked with IIT Kanpur, ST Microelectronics, etc.

4. Support & Services

Our trained technicians are stationed in most of the Indian states to attend to your requirements at shortest possible time.

- **Preventive Maintenance: Every 3 months**
- **Sensor Calibration: Twice a year**
- **Prioritized Location Visits: As and when scheduled**
- **Component Replacement: After a specified period of life**
- **Error Resolution: Within 72 hours of reporting**

5. Focus on Data Quality

- **Data is being monitored round-the-clock**
- **Advanced algorithms & integrity checks are applied on the data**
- **Statistical analysis tools capture parameter drifts**
- **Automated alerts are generated in-case of data failure**

6. Data Quality Checks

- **Syntactic Checks: To ensure that data is as per the sensor resolution and range**
- **Climate-range Checks: To ensure that Datum is consistent with month-wise climatology**
- **Time-series Consistency: Plausible difference between two successive values based on meteorological heuristics**
- **Spatial Consistency: Plausible difference between two nearby stations based on variations**
- **Device Consistency: Comparison with nearest IMD and state government weather stations to avoid systematic errors**

Ingen's Automated Weather Stations provide continuous automatic observations for weather parameters like air temperature, relative humidity, dew point, precipitation, sunlight intensity, short and longwave solar radiation, wind speed & direction, barometric pressure, soil moisture, soil temperature etc. These parameters remain crucial for accurate weather monitoring.

The AWS mast is available in variable shapes & sizes

- From 2 m to 10 m unipole, tripod or triangular tower made up of galvanized iron or stainless steel to which various sensors can be attached.
- The support fixtures and frames for sensors & accessories can also be made as per client's requirements.

AWS Data Flow Diagram

Figure 1

AWS Applications

Weather Forecasting & Weather Data Services

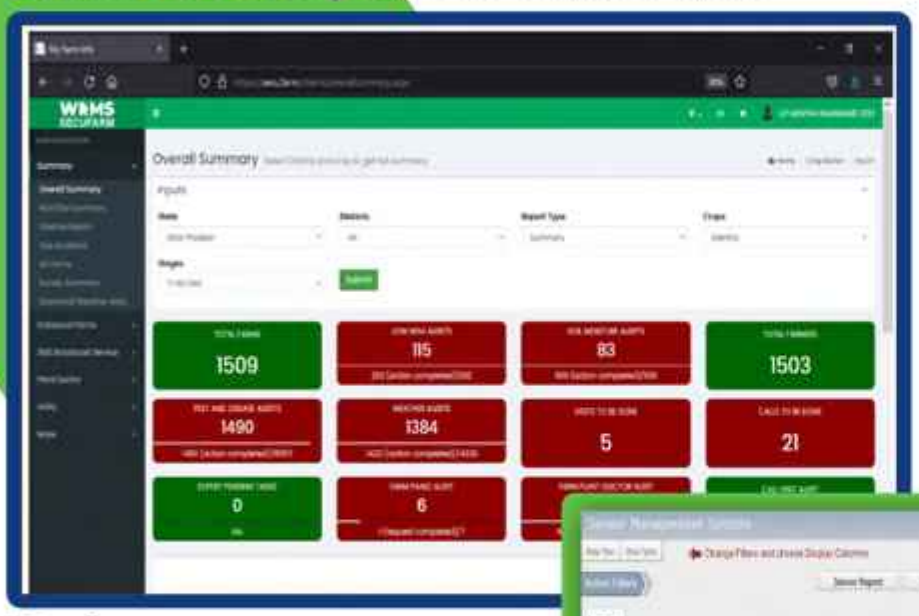


Figure 2

Sensor Management System

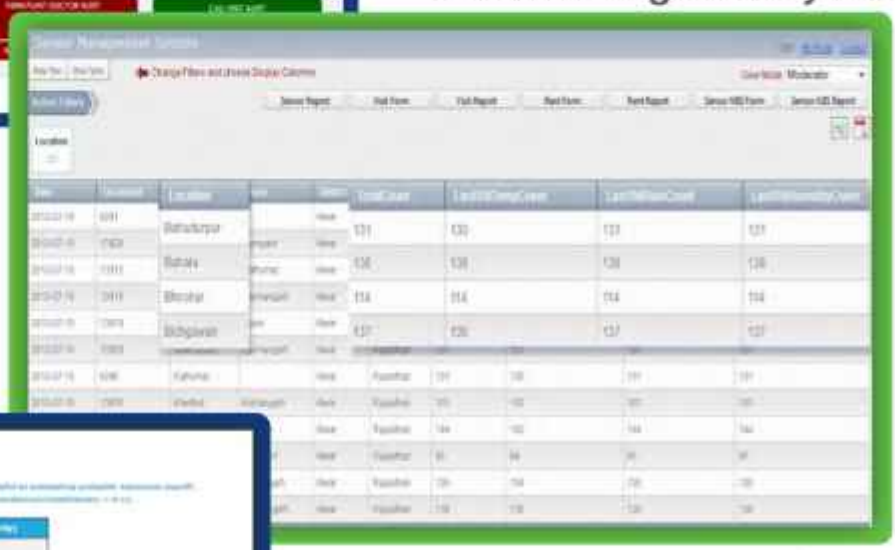


Figure 3

Risk Management

Figure4

Agri Advisory

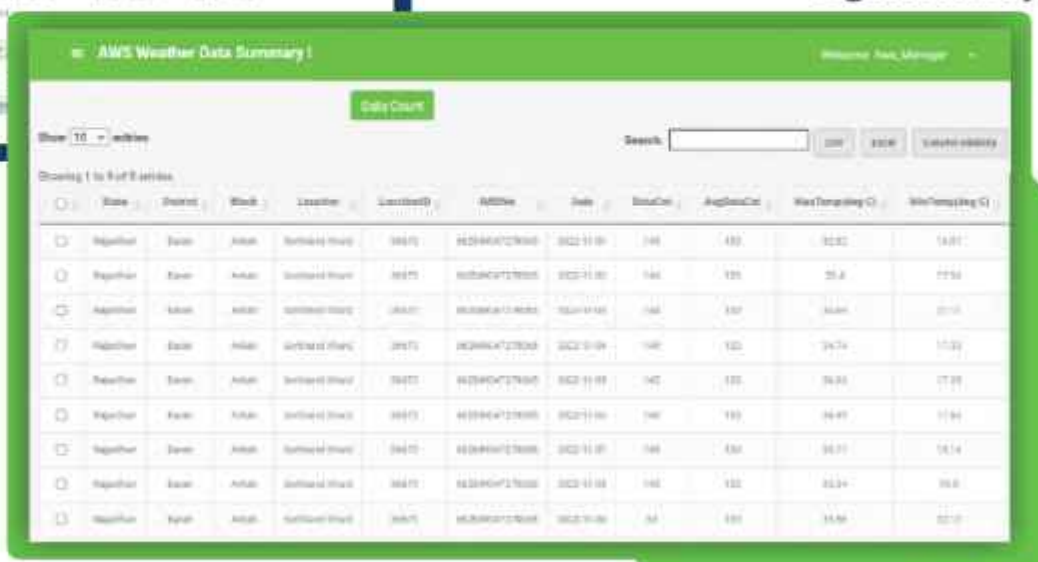


Figure 5

Technical Specifications of AWS Sensors

Air Temperature

Type	: Band gap
Item #	: iTMS101
Range	: -40 to +75°C
Resolution	: 0.1°C
Accuracy	: 0.1°C

Relative Humidity

Type	: Solid state / Capacitive
Item #	: iHMS101
Range	: 0 to 100%
Resolution	: 0.1% RH
Accuracy	: ±2% RH

Precipitation

Type	: TBRG
Material	: ABS/Stainless Steel
Item #	: iRMS101
Range	: 0.2 to 450 mm/hr.
Resolution	: 0.5mm or better
Accuracy	: ±2%

Barometric Pressure

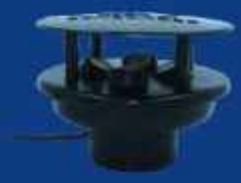
Type	: Solid state
Item #	: iBMS101
Range	: 600-1100 hPa
Resolution	: 0.1 hPa
Accuracy	: ±0.2 hPa
Output	: Digital

Wind Speed

Type	: Ultrasonic
Item #	: iWMS2011
Range	: 0 to 80 m/sec
Resolution	: 0.1 m/s
Accuracy	: ±2% up to 50 m/s and < ±3 % above 50 m/s

Wind Direction

Type	: Ultrasonic
Item #	: iWMS2011
Range	: 0 to 359 Deg
Resolution	: 1 Deg
Response Time	: 2 Sec
Accuracy	: ± 3°



Pyranometer 1

Type	: Photodiode
Item #	: iSRMS201
Range	: 0-1800 Wt/m2
Resolution	: 1 Wt/m2
Spectral Range	: 300-1100nm
Accuracy	: ± 3%

Pyranometer 2

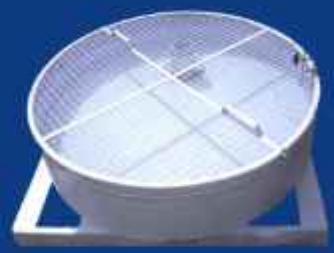
Type	: Thermopile
Item #	: iSRMS202
Range	: 0-2000 Wt/m2
Resolution	: 1 Wt/m2
Spectral Range	: 300-2800nm
Accuracy	: ± 3%

PAR Sensor

Type	: Photodiode
Item #	: iPARS201
Range	: 0-4000 µmol/m2/s
Resolution	: 0.1 µmol/m2/s
Spectral Range	: 300-800nm
Accuracy	: ± 5%

Evaporation Sensor

Type	: Float or Pully/Shaft Encoder
Item #	: iEVPS201
PAN Dia	: 1200mm
Range	: 0-100 m/day
Resolution	: 1mm
Accuracy	: ±1%



Soil Temperature

Type	: RTD Class B / Thermistor
Item #	: iST101
Range	: -10 to +70°C
Resolution	: 0.1°C
Accuracy	: ± 0.3°C

Soil Moisture

Type	: FDR
Item #	: iSM101
Range	: 0 to 100% VWC
Resolution	: 0.1 VWC
Accuracy	: ± 3%

Integrated Data logger

Features

- Ultra "low" power
- 16x2 alphanumeric LCD
- Watchdog timer available
- System Reset option available
- SMS configurable setting command
- 2G/3G/4G compatible GPRS modem
- Firmware Over the Air (FOTA) update feature
- 12 digital/analog channels, 16-bit A/D converter
- Dedicated 32 kHz oscillator for RTC with calibration
- Sample intervals configurable from 1 sec to 24 hours
- Sensor Interface: ADC, SDI-12, SPIs, I2Cs, USARTs, RS232, RS485 etc.
- System Clock Stability 1 ppm per year, real time clock synchronized with GPS

Specification

Memory: 1GB, extendable upto 64GB
External Power: 12V to 24V DC (48 V maximum)
Power Consumption: < 50mA
Basic Communication Interface: RS232, RS485
Main Power option: Solar panel or 12v DC adapter
Operating Temperature: -40 °C to +60 °C
Operating Humidity range: 0% to 100%

Figure 6

Communication Unit

IDCU for AWS iDAS101

Weather Station sends the summarized weather data at programmable interval of 1 minute to several hours. The messages are sent automatically via GPRS to the central server. In the extreme case of no mobile signal, data is stored in the internal flash memory sufficient to store minimum 12-month of weather data. IDCU also has an option of external memory expandable up to 64GB.

Data transmission through GPRS

- The IDCU is able to send the weather station data in a compressed format to the central server using HTTPS/FTP/API or other protocol.
- The data transmission interval is configurable over the air and any new transmissions happen as per the newly configured interval.
- During a signal loss condition, the IDCU will keep trying for the transmission and resume the transmission once the GPRS network is available.

Power Supply

The weather station is a standalone wireless unit powered by Solar Panel (10W to 75 Wt) charged battery of 3.7V, 20AH. Li-cell battery is preferred to ensure consistent power supply. AWS sensors can work for 30-35 days in extremely rainy weather with fully charged batteries.

POWER REQUIREMENTS

- Battery 20Ah/3.7V
- Power consumption <100mA/3.7V
- Battery can be charged through 230V AC (with suitable adaptor) or a 10W-75 W solar panel

PHYSICAL SPECIFICATIONS

- Materials: Stainless steel, Plastic, Anodized Aluminum, Iron
- Height: 1.5 m to 10 m depending on requirement
- Enclosure: 2* 2 sq m to 5*5 sq m
- Weight : approx 7 kg – 20 Kg

Application Software

Portal Software

Portal Software aggregates, manages, analyzes, organizes and distributes weather information into a single system tailored to the preferences of different user groups (farmers, agri officers, insurance companies, administrator, etc).

It broadly does the following

- Data acquisition (from IDCU)
- Data management & display (real-time, history and forecast)
- Administrator (manage the web content based on the authorization model)
- Support section (statistics, SMS, email alerts, data export, etc)
- Resources – high speed networking, high performance computing and large data storage

Clientele

बिहार सरकार

Government of Rajasthan

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